



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460**

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

**Memorandum**

**SUBJECT:** Review of Washington and Idaho Request for Emergency Exemption Use of Thiamethoxam (03WA17) to Control Leafhoppers on Succulent and Dry Beans Grown for Seed, DP Barcode D289546.

**FROM:** Angel A. Chiri, Entomologist  
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**TO:** Andrew Ertman/Robert Forest  
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**PEER REVIEW DATE: 05/21/03**

**Summary**

The Washington State Department of Agriculture (WSDA) and the Idaho Department of Agriculture (IDA) have applied for a regional exemption for use of thiamethoxam, as seed treatment, on succulent and dry beans grown for seed to control leafhoppers that transmit the curly top virus. This is the first year that this request is being made by the States of Washington and Idaho. The States declared a crisis exemption for this use the week of April 14. Although acknowledging that bean fields in the

States of Washington and Idaho were subject to severe beet leafhopper infestations in 2002 and that growers experienced severe crop losses, the request does not contain sufficient pesticide efficacy or yield loss data for BEAD to make a determination whether the pest situation in 2001 is urgent and non routine.

## **Biological Considerations**

### ***Target Crop***

The Pacific Northwest (Idaho, Oregon, and Washington) produces 150,000 acres of dry edible beans. More than 22,000 acres of snap beans on average are grown in the Willamette Valley alone. Eighty-five percent of the seed industry for dry edible beans and snap beans is based in the Pacific Northwest. The 30,000 acres of seed production in the Pacific Northwest is for export as well as for domestic use.

### ***Target Pests and Potential Damage***

According to the WSDA and IDA request, in the past few years growers of beans grown for seed in Washington have experienced significant yield losses due to damage caused by the beet leafhopper, *Circulifer tenellus*. Beet leafhoppers damage beans and other susceptible crops by transmitting the curly top virus. The leafhopper overwinters in sagebrush, Russian thistle, and wild mustards, some of which are curly top virus hosts. In spring and summer, leafhoppers migrate to commercial crops, including beans. In Idaho, the curly top viral disease tends to be more of a problem when winter and spring precipitation is below normal, causing the overwintering wild mustard hosts of the beet leafhopper to die and the leafhoppers to emigrate in search of greener hosts such as beans. Leafhoppers can migrate long distances to summer hosts.

Leafhoppers acquire the virus after feeding on an infected plant for a few minutes and can transmit the virus to a healthy plant in less than four hours after becoming infective. Virus-infected bean plants show a down-cupping, puckering, and wrinkling of infected leaves. The leaves become thick and brittle and may turn dark green. The internodes of infected plants become shortened, resulting in a striking dwarfing and stunting of infected plants, particularly when plants are infected at an early stage of growth. These plants produce few, if any, pods. Plants infected at later stages of growth may senesce early, lose flowers, and produce stunted pods. The curly top virus has a wide host range that includes beans, tomatoes, peppers, sugarbeet, melons, and other crops. This virus is not seedborne or mechanically transmissible. It can only be transmitted by the beet leafhopper. Yield losses due to curly top may vary considerably from year to year as leafhopper populations fluctuate.

According to the request, in the past few years, beans grown for seed in the State of Washington have experienced significant yield losses due to damage caused by the curly top virus. In 2002 a massive number of leafhoppers overwhelmed the treatments with systemic insecticides that are normally used to control its populations, resulting in combined losses of about \$3.8 million for several seed producers in

the Columbia Basin of Washington. The request claims that estimated virus-related yield losses on succulent beans grown for seed ranged from 60 to 100 percent in Washington during 2002, but no supporting evidence for such losses was provided with the submission. BEAD was unable to find information confirming this estimate. A BEAD plant pathologist indicated that 25 percent would be a more likely upper-bound estimate of yield loss due to curly top infection. The request does not elaborate on the conditions that contributed to the high leafhopper populations in 2002 or why it was assumed that such conditions would again prevail in the spring of 2003.

The submission does not provide efficacy data for thiamethoxam nor explains why this particular insecticide was selected, except for a single sentence stating that research trials have shown thiamethoxam to be an effective insecticide against the target pest. The request does indicate that thiamethoxam, applied as seed treatment, is necessary for early season protection of seedlings. It also acknowledges that seed treatment alone will not provide season-long protection, and therefore foliar insecticide applications may be necessary to control the leafhopper throughout the season.

The regional emergency exemption request was submitted by WSDA and IDA for the use of thiamethoxam (Cruiser® 5FS) to treat 300,000 lb of succulent bean seed and 100,000 lb of dry bean seed in Washington and 100,000 lb of succulent bean seed in Idaho, for a total of 500,000 lb of seed in the two states. An estimated maximum of 48.9 gallon of formulated product (approximately 244.5 lb a.i. in total) would be used at the rate of 0.75 - 1.25 fl. oz. per 100 lb of seed, during April 16 and May 15, 2003. The States declared a crisis emergency exemption the week of April 14.

### ***Alternative Control Measures***

Available seed treatment alternatives identified by the request include chlorpyrifos, phorate, aldicarb, disulfoton, and imidacloprid, none of which seems to provide adequate leafhopper control throughout the season. For instance, chlorpyrifos seed treatment does not provide systemic protection to plants against leafhoppers. The efficacy of phorate, applied at-planting, is highly variable. Some seed producers applied aldicarb with poor results. Other seed companies, such as Del Monte, do not allow the use of aldicarb due to human risk concerns.

The applicants maintain that foliar insecticide treatments have not provided dependable season-long protection of bean seedlings in 2002, partially because it has been difficult to predict when the leafhoppers migrate into bean fields in order to time pesticide applications to coincide with such migrations. According to the applicants, in 2002 up to three applications of dimethoate did not provide adequate protection to the bean crop. The request does not mention if acephate was also applied for leafhopper control in 2002. Both acephate and dimethoate are recommended for leafhopper control by the University of California Pest Management Guidelines for dry beans, submitted as an attachment to the request.

According to the Crop Profile for Beans in Idaho, no effective control exists once the leafhopper has migrated to susceptible plants. The Profile indicates that control methods that reduce curly top include

planting resistant varieties, proper timing of plant dates, and applying at-planting systemic insecticides. Control is best achieved by planting the most resistant bean variety available. Cultivars in the pink, pinto, and small red market classes are resistant to curly top. It is unclear if these recommendations are being implemented in the requesting States nor if shifting to these varieties would be an acceptable option to the bean industry.

## Economic Considerations

BEAD conducted a net revenue analysis using historical production data from 1997 to 2001, to determine what the required yield loss would be that would result in a significant economic loss (SEL) for Washington and Idaho dry bean and succulent bean seed producers illustrated in Table 1 below. Based on five years of historical data, the table below illustrates the minimum yield losses for each crop that would have to occur in order for significant economic losses to be realized. Minimum yield loss is defined as the economic loss that reduces the net revenue of producers from the average value to their five year minimum value, with price and cost held constant. For a significant economic loss to occur, yield losses for producers would have to meet or exceed the minimum yield loss threshold with the current registered control alternatives.

**Table 1.** Washington State Estimates of Yield Losses Resulting in Significant Economic Loss (SEL) for Washington and Idaho Dry Bean and Succulent Bean Seed Production.

State	Crop	State's Estimated Yield Loss	State's Yield Loss Used to Estimate Economic Losses	BEAD's Estimated Yield Loss Resulting in SEL	SEL
WA	dry bean seed	60-100%	48%	14.8	Yes
WA	succulent bean seed	60-100%	48%	11.5	Yes

For Washington and Idaho dry and succulent bean seed producers, significant economic loss would be expected to occur if yield losses greater than 14.8 and 11.5 percent, respectively, are realized. However, because the biological analysis was not able to determine if the State's claimed yield losses could be validated due to insufficient data, the SEL findings above only apply if the threshold yield losses illustrated are realized.

Economic production and cost of production data were provided by the State of Washington to estimate the historical net revenue for the period 1997 to 2001. Washington State cited Washington State Agricultural Statistics for the production data and a Report on the Cost of Producing Dry Beans Under Center Pivot Irrigation Washington State (2002) for the variable costs of production for the same time period. The 2002 cost of production data were based on an average cost for 2002 and applied to all years to determine net revenues. Washington State production and cost of production data were used a proxy for Idaho in this regional Section 18 submission.

## Conclusions and Recommendations

After reviewing the Washington and Idaho emergency exemption request for thiamethoxam use on beans grown for seed to control the beet leafhopper, BEAD concludes that there is insufficient biological information in the request to make a determination regarding the urgent and non-routine status of the pest situation. The request was based on 2002 conditions, and there was no attempt to explain why the requesting States assumed that such an uncommon event would be repeated in 2003. No efficacy data were submitted for thiamethoxam. There was no mention of existing or planned programs designed to monitor the abundance of leafhopper populations on wild and cultivated hosts before these migrate to bean fields. BEAD recommends that future requests for thiamethoxam for this same use include efficacy data and a more thorough description of the conditions expected to lead to uncommonly high leafhopper infestation levels.

## **References**

- UC Pest Management Guidelines. 2002. UC IPM Pest Management Guidelines: Dry Beans. UC ANR Publication 3446, Diseases, R. M. Davis, Plant Pathology, UC Davis, A. E. Hall, Botany and Plant Science, UC Riverside, R. L. Gilbertson, Plant Pathology, UC Davis.  
<http://www.ipm.ucdavis.edu/PMG/r52100811.html#COMMENTS>
- USDA Crop Profile for Beans in Idaho. Undated. Prepared by: Samuel J. Fuchs and Ronda E. Hirnyck. <http://pestdata.ncsu.edu/cropprofiles/docs/IDDryBeans.html>